Cert#0640069

Oklahoma State Department of Education

Teaching Certificate

The State Board of Education certifies and authorizes

HEATHER N. VOSS

to serve in the accredited schools of Oklahoma as indicated below.

Description	Level	Valid From	Valid To
ADVANCED MATHEMATICS	6-12	1/1/2012	6/30/2017
INTERMEDIATE MATHEMATICS	6-12	1/1/2012	6/30/2017
MID-LEVEL MATH FOR HIGH SCHOOL CREDIT	5-8	1/1/2012	6/30/2017
PHYSICS	6-12	1/1/2012	6/30/2017

********** NO ENTRIES BELOW THIS LINE **********

National Board of Professional Teaching Standards Science/Adolescence and Young Adulthood (Ages 14-18) Expires 2019

Teacher #: 229689

Print Date: 2/20/2012

Degree: Master's

Class of Certification: Standard

Certification Background Clearance: 3/20/2006

Janet C Barresi

State Superintendent of Public Instruction

Oklahoma State Department of Education Teaching Certificate

Janet C Barresi

State Superintendent of Public Instruction

The State Board of Education certifies and authorizes JENNIE L. CROSLIN to serve in the accredited schools of Oklahoma as indicated below.

Teacher #:179312 **Degree:Master's Degree** **Class:Standard**

Area Description	Level	Valid	Expire
0503 SECONDARY PRINCIPAL	6-12	4/1/2011	6/30/2016
6003 BIOLOGY	6-12	4/1/2011	6/30/2016
6006 CHEMISTRY	6-12	4/1/2011	6/30/2016
6015 PHYSICS	6-12	4/1/2011	6/30/2016
6013 PHYSICAL SCIENCE	6-12	4/1/2011	6/30/2016
6075 SCIENCE	6-8	4/1/2011	6/30/2016
7515 CAREER TECH HEALTH OCCUPATIONS	6-12	4/1/2011	6/30/2016

**********NO ENTRIES BELOW THIS LINE**********

**********NO ENTRIES BELOW THIS LINE**********

National Board of Professional Teaching Standards Science/Adolescence and Young Adulthood (Ages 14-18) Expires 2011

JENNIE L. CROSLIN
7200 NW 110TH
OKLA CITY, OK 73162

print date4/27/2011 C

Certificate Above for Personal Records

Submit Certificate Below to School District

Cert#0639810

The State Board of Education certifies and authorizes

GARY W. PIERCEY

to serve in the accredited schools of Oklahoma as indicated below.

Description	Level	Valid From	Valid To
PHYSICAL EDUCATION/HEALTH/SAFETY	PK-12	2/1/2012	6/30/2017
ALGEBRA	6-12	2/1/2012	6/30/2017
ANALYSIS	6-12	2/1/2012	6/30/2017
CALCULUS	6-12	2/1/2012	6/30/2017
COMPUTER SCIENCE/APPLICATIONS	6-12	2/1/2012	6/30/2017
GENERAL MATHEMATICS	6-12	2/1/2012	6/30/2017
GEOMETRY	6-12	2/1/2012	6/30/2017
STATISTICS	6-12	2/1/2012	6/30/2017
TRIGONOMETRY	6-12	2/1/2012	6/30/2017

**********NO ENTRIES BELOW THIS LINE **********

Teacher #: 207843

Print Date: 2/13/2012

Degree: Bachelor's

Class of Certification: Standard

Janet C. Barresi

State Superintendent of Public Instruction

Janet C. Barresi

State Superintendent of Public Instruction

The State Board of Education certifies and authorizes GARY W. PIERCEY to serve in the accredited schools of Oklahoma as indicated below.

Teacher #:207843 Degree:Bachelor's Degree Class:Standard

Area Description	Level	Valid	Expire
2019 PHYSICAL EDUCATION/HEALTH/SAFETY	PK-12	2/1/2012	6/30/2017
5501 ALGEBRA	6-12	2/1/2012	6/30/2017
5505 CALCULUS	6-12	2/1/2012	6/30/2017
5509 GENERAL MATHEMATICS	6-12	2/1/2012	6/30/2017
5517 TRIGONOMETRY	6-12	2/1/2012	6/30/2017

Area Description	Level	Valid	Expire
5503 ANALYSIS	6-12	2/1/2012	6/30/2017
5507 COMPUTER SCIENCE/APPLICATIONS	6-12	2/1/2012	6/30/2017
5511 GEOMETRY	6-12	2/1/2012	6/30/2017
5515 STATISTICS	6-12	2/1/2012	6/30/2017

**********NO ENTRIES BELOW THIS LINE**********

**********NO ENTRIES BELOW THIS LINE**********

GARY W. PIERCEY

7524 NW 133RD ST

OKLAHOMA CITY, OK 73142

print date2/13/2012 C

Certificate Above for Personal Records

Submit Certificate Below to School District

Janet C. Barresi

State Superintendent of Public Instruction

The State Board of Education certifies and authorizes GARY W. PIERCEY to serve in the accredited schools of Oklahoma as indicated below.

Teacher #:207843 Degree:Bachelor's Degree Class:Standard

Area Description	Level	Valid	Expire
2019 PHYSICAL EDUCATION/HEALTH/SAFETY	PK-12	2/1/2012	6/30/2017
5501 ALGEBRA	6-12	2/1/2012	6/30/2017
5505 CALCULUS	6-12	2/1/2012	6/30/2017
5509 GENERAL MATHEMATICS	6-12	2/1/2012	6/30/2017
5517 TRIGONOMETRY	6-12	2/1/2012	6/30/2017

Area Description	Level	Valid	Expire
5503 ANALYSIS	6-12	2/1/2012	6/30/2017
5507 COMPUTER SCIENCE/APPLICATIONS	6-12	2/1/2012	6/30/2017
5511 GEOMETRY	6-12	2/1/2012	6/30/2017
5515 STATISTICS	6-12	2/1/2012	6/30/2017

**********NO ENTRIES BELOW THIS LINE**********

**********NO ENTRIES BELOW THIS LINE**********

Science, Technology, Engineering & Mathematics

FRANCIS TUTTLE TECHNOLOGY CENTER

careertech

Computer Science STEM Academy

Career Pathway Individual Career Plan for: Learners ▶ Parents ▶ Counselors ▶ Teachers/Faculty

This individual career plan can serve as a guide, along with other career planning materials, as learners work to achieve their career goals. Courses listed within this plan are options for recommended coursework. The learner's plan should be individualized to meet his/her educational and career goals. This plan should also be customized with the educational institution's specific course titles and meet college ready/work ready requirements.

Science, Technology, Engineering, and Mathematics: Engineering and Technology

Grade Level	English/ Language Arts (4 units required)	Math (3 units required)	Science (3 units required)	Social Studies/ Sciences (3 units required)	Other Required Courses	Required CTE Elective Courses (Technology Center)	Available Industry Certifications
	8th Grade and High School						
High School 8	8th Grade English	Algebra I Algebra II** Pre AP Geometry** Pre AP Algebra II Pre AP Trigonometry/ Calculus** AP Calculus (AB)** AP Calculus (BC)** **Academic Courses that can be taken at the technology center	8th Grade Science	8th Grade Civics	Financial Literacy	**PLTW Beginning Sophomore year:** Intro to Computer Science (for those students with no program skills) * Or Computer Science and Software Engineering (for students with programing skills) ** Specialty courses Artificial Intelligence Simulation and Modeling Cyber Security Computational Problem Solving-capstone course	End of Course Exams : Computer Science and Software Engineering other relevant CTE industry certifications in the Computer Science Area CTSO Involvement SkillsUSA,BPA or TSA
9	English/LA I		Physical Science	US Government Oklahoma History	Computer Technology and Computer Technology II -or- Foreign Language I and Foreign Language II Concurrent Enrollment Speech		
10	English/LA II		Biology I	World History			
11	English/LA II		Chemistry** Pre AP Physics** AP Physics **	U.S. History Economics Geography Concurrent Enrollment American Government American History			
12	English/LA IV Concurrent Enrollment English Composition I						
	Career Development ☐ *Oklahoma Career Guide- takes place K-Adult*						
	Postsecondary Programs and Degrees						
Postsecondary Options 13	-English Comp I -English Comp II	-Calculus I	-Biology	-American Government	Per Institution requirements, other courses necessary include humanities, international dimension, diversity, and areas.		
14	-Speech/Oral Communications	–Calculus II		-American History			
15	Continue courses in your area of specialization				NOTE: Use the postsecondary institution's degree plan to help customize the learner's plan with regard to degrees, licenses, certification, etc.		
16	Complete STEM related Major (4-year degree program)						

(Learner Name)	(Learner Signature)	(Parent/Guardian Signature)	(School Official Signature)

Dates: Freshman review _____ Sophomore review _____ Junior Review _____ Senior Review _____

OKLAHOMA WORKS

Computer programming is a special case of mathematical problem solving. In the Computer Science and Software Engineering course, every effort will be made to connect the computer science coursework to the geometry, algebra 2 and other college preparatory mathematics coursework. On a general level, the idea of "data type" is similar to the concept of a "set", the two concepts of functions are very similar, and constructing a proof (particularly an analysis proof) is similar to writing a programming function. The following Knowledge and Skills statements (from Computer Science and Software Engineering) demonstrate some of the connections that will be made to the college preparatory mathematics courses that our students are required to take.

- U4.01 - Programs implement algorithms to solve problems (K4.05, K4.01)
- U4.02 - Algorithms can be analyzed for efficiency, and appropriate algorithms can be selected based upon efficiency
- U4.03 - Empirical analysis of algorithms requires a systematic approach (S5.09, S5.13)
- U5.02 - Solutions in a programming language are created by breaking a problem apart into component problems (S5.01, S4.01)
- U5.03 - Creating solutions with computation requires a persistent, iterative problem-solving approach (K5.01) (S5.09, S5.07)
- U5.04 - Programming requires an understanding of mathematical operations and data abstractions (K4.05)
- U5.06 - Functions with arguments make code modular and reusable (S5.01)
- K4.05 - Recognize common patterns employing variables, including value accumulation, list aggregation, and iteration across the elements of a collection (U4.01, U5.04)
- KU5.07 - Programmers create high-level documentation to communicate the purpose and function of their code (S8.02)4.05

The ability to communicate about mathematics is a very important part of mathematics education. Justifying the thought process in mathematics will be directly tied to documenting and communicating the purpose and function of programming code. In the lessons about Moore's Law, students will explore simulation in NetLogo directly by manipulating a model of predation and a model of the spread of viruses in humans. After the instructor completes the PLTW Computer Science and Software Engineering training, the math syllabi will reflect more specific connections to the computer programming courses.

PROJECT LEAD THE WAY
PLTW

To: Oklahoma State Board of Education
From: Robin Schott, Vice President West Central Region
RE: Francis Tuttle Computer Science Academy

As one of the Regional Vice President for Project Lead The Way representing Oklahoma I am particularly pleased to write this letter of recommendation for the Francis Tuttle Computer Science Academy. I have worked closely with Francis Tuttle through their implementation of their Pre-Engineering and Bioscience and Medicine Academies, first as one of the Associate State Directors for Oklahoma Department of Career and Technology Education and now as a VP for PLTW. The Francis Tuttle Regional Technology Center continues to be a leader for Oklahoma in innovative program development for high school students.

They will be using a combination of pre-AP and AP math and science courses as well as the entire Project Lead The Way course sequence for the new Computer Science pathway. The need to increase student awareness and preparation in computer science fields is imperative for our state and the nation. Current predictions shows within 5 years, 50 percent of the new STEM jobs will require Computer Science and less than 2.4 percent of college graduates have a computer science degree. It is extremely important that we find a way to inspire, motivate and prepare more students to pursue computer science degrees and careers.

Project Lead The Way is partnering with universities and K-12 schools across the country to implement an entire pathway, K-12 in Computer Science. Francis Tuttle is proposing that they will implement all of the high school Computer Science courses in this pathway. The first two courses in the pathway are written using the College Board AP Computer Science frameworks. Students that take Computer Science and Software Engineering and the Computer Science Application courses will be prepared to sit for not only the PLTW national exam, but the AP College Board exams as well. These are the foundation courses for all students in the Academy. Students can then choose specialty courses in Artificial Intelligence, Cybersecurity, or Simulation and Modeling. These courses are currently under development and will be written to standards above the first two foundational AP equivalent foundational courses. Students will complete a capstone experience in the final course, Computational Problem Solving where they will work in a team to deliver a software solution to a real-world design problem.

We are very excited about the leadership Francis Tuttle is providing for our state and for the nation in implementing one of the first Computer Science Academies for high school students. Their students will be extremely prepared for any computer science degree program and/or computer science career. We know that other technology centers and high schools will adopt this rigorous model of math, science, and computer science courses; just as they have for pre-engineering and bioscience.

I have also attached a document that highlights the new partnership between College Board and PLTW in the development of nationally recognized STEM pathways for high school students.

The College Board and Project Lead The Way

Expanding College and Career Opportunities

The Challenge We Face

By the year 2020, almost two-thirds of jobs, and nearly all high-paying jobs, will require postsecondary education or training. And, by 2018, 92 percent of traditional science, technology, engineering, and math jobs will be for those with at least some postsecondary education and training. Increasingly, career readiness is dependent on college success. To ensure all students are ready to compete in the global market place, we need to expand access to challenging course work and ensure students are prepared for college and career success.

Our Solution: Partnering to Create More Opportunities for Students

The College Board is a mission-driven, not-for-profit membership organization committed to expanding access to opportunity for students through its programs and services. Project Lead The Way (PLTW) is a not-for-profit committed to preparing students for the global economy and the nation's leading provider of K-12 science, technology, engineering, and math (STEM) programs.

The two organizations recognize the importance of preparing more students, earlier, to pursue STEM degrees and careers. They have partnered to offer new opportunities for schools and students. By bringing together the successes of both the AP® Program and PLTW's applied learning programs — both of which are shown to improve student outcomes — the organizations' partnership will:

- Increase the number and diversity of students who develop interest in and readiness for STEM degrees and careers;
- Provide these students with academic and applied learning courses that prepare them for college and career; and
- Increase opportunities and recognition for students who demonstrate college and career readiness.

The College Board and PLTW are forging a long-term partnership to develop college and career pathways in Engineering, Biomedical Science, and Computer Science by combining Advanced Placement Program® (AP) courses with PLTW programs. Each pathway will emphasize applied learning and consist of three components:

1. PLTW courses designed to introduce all students to the field;
2. AP courses that provide an opportunity for college credit; and
3. PLTW specialization courses that focus on knowledge and skills needed for high-growth careers.

CollegeBoard

PROJECT LEAD THE WAY PLTW

Local flexibility will be a cornerstone of each pathway; schools will have the discretion to implement these pathways in ways that work best for their students and school. The chart below illustrates a variety of courses that may be combined to establish different pathways for students.

Combining AP and PLTW Courses

Level	Engineering	Biomedical Science	Computer Science
Readiness – PLTW courses	– Introduction to Engineering Design	– Principles of Biomedical Science	– Introduction to Computer Science
College – AP courses	– AP Physics 1 – AP Physics 2 – AP Physics C: Electricity and Magnetism – AP Physics C: Mechanics – AP Calculus AB – AP Calculus BC – AP Biology – AP Chemistry	– AP Biology – AP Chemistry	– AP Computer Science Principles – AP Computer Science A
Career – PLTW courses	– Principles of Engineering – Digital Electronics – Computer Integrated Manufacturing – Aerospace Engineering – Civil Engineering & Architecture – Environmental Sustainability – Engineering Design & Development	– Human Body Systems – Medical Interventions – Biomedical Innovation	– Artificial Intelligence – Simulation & Modeling – Cybersecurity – Computational Problem Solving

As part of the overall effort, and in time for the 2016-17 school year, the organizations are also working to develop:

- New recognition credentials for students and schools in Engineering, Biomedical Science, and Computer Science that combine AP courses and exams and PLTW's applied learning programs; and
- A portfolio of career-focused opportunities that allow students to pursue work-based learning and mentorships with leading industry partners.

The College Board is also in the process of exploring the development of new AP courses to support the pathways.

PLTW Computer Science - Computer Science and Software Engineering (CSE) - Overview

Copyright Notice

Unit 1 Algorithms, Graphics, and Graphical User Interfaces - Lesson 1.1 Algorithms and Agile Development

Lesson 1.1 Algorithms and Agile Developme...

- Activity 1.1.1 Principles
- Activity 1.1.2 Light-bot: Input, Output, State
- Activity 1.1.3 Branching and Iteration
- Activity 1.1.4 Objects and Methods
- Activity 1.1.5 Variable Roles Part I
- Activity 1.1.6 Variable Roles Part II
- Problem 1.1.7 Scratch Game or Story

Lesson 1.1 Algorithms and Agile Developme...

Unit 1 Algorithms, Graphics, and Graphical User Interfaces - Lesson 1.2 Mobile App Design

Lesson 1.2 Mobile App Design - Overview

- Activity 1.2.1 Bits and Bytes
  - 1.2.1 Check for Understanding - Binary... 2 pts

Activity 1.2.2 Introducing App Inventor

Activity 1.2.3 Creating Mobile Apps

Activity 1.2.4 Analyzing a Program

Project 1.2.5 Modifying a Program

Problem 1.2.6 Designing an App

Lesson 1.2 Mobile App Design - Key Terms

Unit 1 Algorithms, Graphics, and Graphical User Interfaces - Lesson 1.3 Algorithms in Python

Lesson 1.3 Algorithms in Python - Overview

Activity 1.3.1 Programs are Data

Activity 1.3.2 Python Variables and Functi...

Activity 1.3.3 Branching and Output

Activity 1.3.4 Nested Branching and Input

Activity 1.3.5 Strings

Activity 1.3.6 Tuples and Lists

1.3.6 Check for Understanding #1 - Vari... 5 pts

1.3.6 Check for Understanding #2 - Vari... 5 pts

Activity 1.3.7 For Loops

Activity 1.3.8 While Loops

Project 1.3.9 Tools for Collaboration

Lesson 1.3 Algorithms in Python - Key Terms

Unit 1 Algorithms, Graphics, and Graphical User Interfaces - Lesson 1.4 Images and Object-Oriented Libraries

Lesson 1.4 Images and Object-Oriented Libra...

- Activity 1.4.1 Procedural Abstraction
- Activity 1.4.2 Objects and Methods
- Activity 1.4.3 Images and Arrays
- Activity 1.4.4 Python Imaging Library API
- Project 1.4.5 Image Algorithms
- Activity 1.4.6 Digital Property and Forensics
- Problem 1.4.7 Image Artist

Lesson 1.4 Images and Object-Oriented Libra...

Lesson 1.4 Images and Object-Oriented Libra... 12 pts

Unit 1 Algorithms, Graphics, and Graphical User Interfaces - Lesson 1.5 GUIs in Python

Lesson 1.5 GUIs in Python - Overview

- Activity 1.5.1 Human-Computer Interaction
- Activity 1.5.2 The API for Tkinter Canvas
- Activity 1.5.3 The MVC Pattern with Tkinter
- Problem 1.5.4 Design a Python GUI

Lesson 1.5 GUIs in Python - Key Terms

Unit 2 The Internet - Lesson 2.1 The Internet and the Web

Lesson 2.1 The Internet and the Web - Overvi...

Activity 2.1.1 The Rise of the Internet

Activity 2.1.2 Your Favorite Web Page

Activity 2.1.3 Protocols and Bandwidth

2.1.3 Check for Understanding - Intern... 2 pts

Project 2.1.4 HTML and CSS

Activity 2.1.5 Secure Protocols

Lesson 2.1 The Internet and the Web - Key Te...

Unit 2 The Internet - Lesson 2.2 Shopping and Social on the Web

Lesson 2.2 Shopping and Social on the Web -...

Activity 2.2.1 HTML5 and JavaScript

Activity 2.2.2 Introducing PHP

Activity 2.2.3 Databases and SQL

Problem 2.2.4 Dynamic Data-Driven Design

Activity 2.2.5 Career Fields of CS and IT

Lesson 2.2 Shopping and Social on the Web -...

Unit 2 The Internet - Lesson 2.3 Security and Cryptography

- Lesson 2.3 Security and Cryptography - Over...
  - Activity 2.3.1 The Vulnerable User
  - Activity 2.3.2 Security by Encryption
  - Activity 2.3.3 Security and Liberty
  - Project 2.3.4 The Heist
- Lesson 2.3 Security and Cryptography - Key ...

Unit 3 Raining Reigning Data - Lesson 3.1 Visualizing Data

- Lesson 3.1 Visualizing Data - Overview
  - Activity 3.1.1 Time Series and Trends
  - Activity 3.1.2 Issues with Data
  - Activity 3.1.3 Big Data and Parallel Proces...
  - Activity 3.1.4 Pie Charts and Bar Graphs
  - Activity 3.1.5 Histograms and Distributions
- Lesson 3.1 Visualizing Data - Key Terms

Unit 3 Raining Reigning Data - Lesson 3.2 Discovering Knowledge from Data

- Lesson 3.2 Discovering Knowledge from Dat...
  - Activity 3.2.1 Inferential Statistics

Activity 3.2.2 Image Data

Activity 3.2.3 Linked Data

Activity 3.2.4 Geographic Data

Activity 3.2.5 Considering GATTACA

Project 3.2.6 Genomic Data

Problem 3.2.7 Investigating with Data

Lesson 3.2 Discovering Knowledge from Dat...

Unit 4 Intelligent Behavior - Lesson 4.1 Moore's Law and Modeling

Lesson 4.1 Moore's Law and Modeling - Over...

Activity 4.1.1 Computing Impacts All Fields

Activity 4.1.2 Basic Control Circuits

Activity 4.1.3 Introducing Simulations

Activity 4.1.4 Varying Parameters

Activity 4.1.5 Assumptions, Abstractions, ...

Lesson 4.1 Moore's Law and Modeling - Key ...

Unit 4 Intelligent Behavior - Lesson 4.2 Intelligent Agents

Lesson 4.2 Intelligent Agents - Overview

Activity 4.2.1 Emergent Behavior

- Activity 4.2.2 Neural Networks
- Project 4.2.3 Modifying a Simulation's Ass...
- Activity 4.2.4 Beauty in Chaos and Fractals
- Project 4.2.5 Computer Science Principles
- Lesson 4.2 Intelligent Agents - Key Terms